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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/31684

A. CLASSIFICATION OF SUBJECT MATTER		
IPC(7) : G01S 5/14; H04B 1/69; H03D 1/04		
US CL : 342/ 357.05, 357.09, 357.12, 357.15; 375/148, 346		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 342/ 357.05, 357.09, 357.12, 357.15; 375/148, 346		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,204,808 B1 (BLOEBAUM et al) 20 March 2001, (20.03.2001), see entire document	1-19
Y	US 6,222,483 B1 (TWITCHELL et al) 24 April 2001 (24.04.2001), see entire document	1-19
Y	US 6,067,045 A (CASTELLOE et al) 23 May 2000 (23.05.2000) see entire document and features directed to Invention V	1-19
Y	US 6,317,077 B1 (SOLEIMANI et al) 13 November 2001 (13.11.2001), see Fig 5, eg.	1-3
Y	US 4,453,165 A (MAINE) 5 June 1984 (5.06.1984), see entire document.	1-3
Y	U 6,369,754 B1 (LEVANON) 9 April 2002 (9.04.2002) see entire document.	1-3
P, Y	US 2003/0090413 A1 (SYRJARIANNE et al) 15 May 2003 (15.05.2003) see Figure 2.	1-3
Y	GB 2,222,040 A (YAMAMOTO et al) 21 February 1990 (21.02.1990), see entire document.	4-7
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 21 July 2004 (21.07.2004)		Date of mailing of the international search report 03 NOV 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Gregory C. Issing <i>J. D. Adger</i> Telephone No. 703-306-4171

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,841,396 A (KRASNER) 24 November 1998 (24.11.1998) see entire document	4-7
Y	US 2001/0034210 A1 (NIR et al) 25 October 2001 (25.10.2001) see entire document	4-7
Y	US 5,737,715 A (DEATON et al) 7 April 1998 (7.04.1998) see entire document	4-7
Y	US 5,717,403 A (NELSON et al) 10 February 1998 (10.02.1998) see entire document	4-7
Y	US 5,157,697 A (ANVARI et al) 20 October 1992 (20.10.1992) see entire document	8-10
Y	US 2001/0046256 A1 (NORMAN et al) 29 November 2001 (29.11.2001) see entire document	8-10
Y	US 6,236,354 B1 (KRASNER) 22 May 2001 (22.05.2001) see entire document	8-10
Y	US 6,292,520 B1 (TSUKAHARA) 18 September 2001 (18.09.2001) see entire document	11-15
Y	US 6,229,998 B1 (HAMDY et al) 8 May 2001 (8.05.2001) see entire document	11-15
Y	US 6,052,421 A (RICHARDSON et al) 18 April 2000 (18.04.2000), see entire document	11-15
Y	US 5,430,894 A (NOHARA et al) 4 July 1995 (4.07.1995) see entire document	11-15
P,X	US 6,701,253 B2 (EDWARDS et al) 2 March 2004 (2.03.2004) see Figs 1 and 2	16-17
Y	US 6,323,803 B1 (JOLLEY et al) 27 November 2001 (27.11.2001) see entire document	16-17
Y	US 6,211,819 B1 (KING et al) 3 April 2001 (3.04.2001) see entire document	16-17
Y	WO 02/23213 A2 (NIR et al) 21 March 2002 (21.03.2002) see entire document.	18,19
Y	US 6,091,785 A (LENNEN) 18 July 2000 (18.07.2000) see entire document	19
Y	US 5,535,237 A (LaPADULA, III et al) 9 July 1996 (9.07.1996) see entire document	19

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☒ No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-3, drawn to a system including a processor for computing location using Doppler differences.

Group II, claim(s) 4-7, drawn to a system including a processor for calibrating a local oscillator by counting local oscillator cycles and fractions over a period determined by the number of signal framing intervals.

Group III, claim(s) 8-10, drawn to a system including a canceler integrated into a correlator for canceling strong signals.

Group IV, claim(s) 11-15, drawn to a system including a processor for extracting signal power spectrum from noise by averaging.

Group V, claim(s) 16-17, drawn to a system for storing orbital data in a lookup table.

Group VI, claim(s) 18, drawn to a system including a processor for obtaining full time of transmit from partial code phase, a time stamp and a location estimate.

Group VII, claim(s) 19, drawn to a system including a search engine having a search range of at least 60 chips after initial acquisition.

The inventions listed as Groups I and II/III/IV/V/VI/VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: none of Groups II-VII require the special technical feature of computing a location estimate using Doppler differences.

The inventions listed as Groups II and III/IV/V/VI/VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: none of Groups III-VII require the special technical feature of calibrating the local oscillator.

The inventions listed as Groups III and IV/V/VI/VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: none of Groups IV-VII require the special technical feature of a canceller integrated into a correlator.

The inventions listed as Groups IV and V/VI/VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: none of Groups V-VII require the special technical feature of a processor controlling a program for extracting signal power spectrum from noise by averaging.

The inventions listed as Groups V and VI/VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: none of Groups VI-VII require the special technical feature of storage of orbital coefficients in a look-up table.

The inventions listed as Groups VI and VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group VII does not require the special technical feature of a processor obtaining full time of transmit from partial code phase, a reference time stamp and an estimate of location.